

VII. *A Contribution to the History of Stylops, with an Enumeration of such Species of Exotic Hymenoptera as have been found to be attacked by those Parasites.*  
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THE principal object of the short communication which I now offer to the Entomological Society, is to make known the genera and species of such exotic *Hymenoptera* as have been observed to be infested by *Stylops*, or species belonging to allied genera.

I am not aware of any attempt having been recently made to collect materials for the purpose of ascertaining the geographical range of these interesting parasites;\* and having myself obtained additional material for that purpose, I have thought it might prove interesting to the Society if I laid it before them in a collected form.

The first specimen on record of the genus *Stylops* was found by the Rev. William Kirby on *Andrena nigro-ænea*, and it appears remarkable that, as that species is very plentiful in the London district, and stylopedized *Andrenidæ* by no means rare, that I should never have observed a specimen of *Andrena nigro-ænea* infested by the parasite.

In the neighbourhood of London, according to my observation, the species of *Andrena*, most commonly attacked, is *A. Trimmerana*, the female most frequently, but the male also occasionally. I possess twelve stylopedized individuals of this species, four of which are of the male sex. By diligently collecting the bees belonging to the genus *Andrena*, I should expect to obtain nine or ten infested bees in a season, but should consider it quite probable that not one would produce a male *Stylops*—I should say, judging from my own experience in collecting in the neighbour-

\* Mr. Westwood, in his Introduction to the "Modern Classification of Insects," published in 1842, has, in his valuable History of the *Strepsiptera*, brought together all that had been observed up to that period, and has added a great amount of new and interesting information.

hood of London, that not more than one male *Stylops* occurs to twenty females; supposing this to be the case, and that each female *Stylops* produced six thousand larvæ, which is within the calculation made by Mr. Newport in his "Natural History of the Strepsiptera," we should have a total result of one hundred and fourteen thousand larvæ of *Stylops*, and this from the nineteen individuals which we captured alone; were it not that few of these ever attain their perfect condition, surely our only difficulty would be to find a bee not infested by a parasite.

The explanation of this apparent difficulty will be perhaps best given to those who have not investigated the subject, if I relate my observations on a female of *A. Trimmerana*, which was infested by a female *Stylops*. The *Andrena* had been kept six or eight days in a box covered with fine net, she had been well supplied with fresh flowers, and was very active and apparently healthy; my notice was attracted by observing the bee running about apparently in a very excited state, burying herself beneath the leaves and flowers, then issuing forth and running round the sides of the box; sometimes she would stop, bury her head in the petals of a *Dandelion*, and then commence brushing herself with her posterior legs, passing them quickly over the upper surface of the abdomen; these unusual movements on the part of the bee led me to examine her more closely. I then found that she was covered with hundreds of the larvæ of *Stylops*, and her brushing and excitement was caused by efforts, on her part, to free herself from the annoyance which the host of larvæ evidently occasioned her. There can be little doubt of hundreds, nay, thousands of the larvæ being brushed off in situations, where, from want of sustenance, they of necessity perish; whilst others, falling into the petals of flowers, may attach themselves to bees which subsequently visit them to extract their sweets; whilst others, fixing themselves to insects of other orders, are removed from the chance of finding a situation in which proper sustenance would enable them to attain a state of maturity.

Although *Stylops* is at present considered a rare insect, particularly the male, I have no doubt it will be found in abundance when once the proper locality is discovered and diligently searched by a competent Entomologist. I have never had the good fortune to discover a colony of *Andrena convexiuscula*, a bee which appears to be always infested, or I feel pretty certain I should have obtained *Stylops* in plenty. All the specimens which I possess of *A. convexiuscula*, those in the National Collection, and all which

I have seen in other cabinets, are invariably attacked. I therefore imagine the discovery of a colony of that species of *Andrena* is all that is requisite to supply *Stylops* in abundance.

The following is a list of British *Andrenidæ*, which I have observed to be subject to the parasitic attacks of *Stylops* :—

- Halictus minutus*, ♀.  
 ——— *nitidiusculus*, ♀.  
 ——— *longulus*, ♀.  
*Andrena bicolor*, ♂, ♀.  
 ——— *Trimmerana*, ♂, ♀.  
 ——— *nitida*, ♂, ♀.  
 ——— *varians*, ♂.  
 ——— *xanthura*, ♂.  
 ——— *Afzeliella*, ♂.  
 ——— *fuscata*, ♀.  
 ——— *chrysosecles*, ♀.  
 ——— *convexiuscula*, ♂, ♀.

It will be seen by this list that none of the species which are very pubescent, or have the segments thickly fringed with pubescence, have been observed to be infested, although such would appear to be the species most likely to collect the larvæ when visiting those flowers which contain them.

The only specimens of *Andrenidæ* which I have seen infested, not British or Continental, are a male and female *Andrena* from East Florida, closely allied to the European *A. chrysosecles*; the head and thorax of two female *Stylops* protrude from beneath the fourth segment of the abdomen of the female, and one from beneath the fifth segment of the other sex, a male *Stylops* having emerged from beneath the second segment. I have also seen a single specimen of an *Andrena* from East Florida infested by a single female *Stylops*, and three specimens of *Andrena victima* from Nova Scotia. Specimens of *Polistes Gallica*, infested by *Xenas vesparum*, are to be seen in most collections of *Hymenoptera*, and possess an additional interest, from the fact of the celebrated Rossi having first discovered these remarkable insects infesting that genus of wasps.

#### Fam. SPHEGIDÆ.

Species of the genus *Ammophila* appear to be particularly subject to the attacks of *Stylopidæ*. I have observed the following :—

*Ammophila holosericea*, ♀, from Sicily. A male parasite having

escaped from beneath the second abdominal segment, a female still protruding from beneath the same; the third segment has the pupa case of an escaped male beneath it, and the fourth is distorted by the head and thorax of a female parasite.

*Ammophila* ———? ♂, from Tunis. The abdomen is greatly distorted by the pupa case of an escaped male parasite; judging from the size of the case, I should conclude the *Stylops* to be four times the size of *S. Melittæ*.

*Ammophila ferrugineipes*, ♀, Gambia. The abdomen distorted by the pupa case of an escaped *Stylops* from beneath the third segment.

*Sphex petiolata*, ♂, Brazil. The head of a very large female *Stylops* beneath the fifth abdominal segment.

*Sphex flavipes*, ♀, Georgia. The fourth segment distorted by the pupa case of an escaped male *Stylops*.

*Pelopæus Chiliensis*, ♀. The pupa case of an escaped male beneath the fourth abdominal segment.

*Pelopæus laboriosus*, ♀, Aru Island. Two female *Stylops* beneath the fourth segment of the abdomen.

*Pelopæus difformis*, from Shanghai. Has a female *Stylops* protruding from beneath the third abdominal segment.

*Pelopæus* ———, from Celebes. Attacked by a female *Stylops*.

*Belonogaster junceus*, from Tripoli. Attacked by a female *Stylops*.

#### VESPIDÆ.

*Eumenes petiolata*, ♀, India. The abdomen of the third segment with a female *Stylops* beneath it, and the fourth distorted by the pupa case of an escaped male.

*Odynerus* ———? ♀, Brazil. The abdomen greatly distorted by a male *Stylops* protruding beneath the third segment.

*Polybia sericea*, ♀, Brazil. A female protruding beneath the fourth segment.

*Polistes Americanus*, ♀, N. America. The abdomen much distorted by a male *Stylops* having escaped from the pupa case, which projects from beneath the fourth segment.

*Polistes instabilis*, ♀, Brazil. The abdomen distorted by the pupa case of a male *Stylops* beneath the fourth segment, and the head of a female beneath the fifth segment.

The foregoing enumeration of species, and the localities from whence they were derived, shows that *Stylops* and its affinities, or rather allies, have a wide geographical range. Some of the parasites must be insects of considerable size, as compared with the British species; judging from the size of the pupa cases, I should expect that the expansion of wing of the *Stylops* infesting *Polistes instabilis* could not be much less than eight lines, or two-thirds of an inch.

I have not observed any insect from the Australian continent or New Zealand infested by *Stylops*.

	Authority.	Britain.	Europe.	Asia.	Africa.	North America.	South America.	Tasmania.
<i>Halictus minutus</i> . ♀	Smith	*						
" <i>nitidusculus</i> . ♀	Smith	*						
" <i>longulus</i> . ♀	Smith	*						
" <i>ceratus</i> . ♀	Dale	*						
<i>Audrena labialis</i> . ♀	Dale	*						
" <i>nigro-aenea</i> . ♂, ♀	Kirby	*						
" <i>tibialis</i> . ♂, ♀	Pickering	*						
" <i>bicolor</i> . ♂	Smith	*						
" <i>Trimmerana</i> . ♂, ♀	Smith	*						
" <i>fulvicrus</i> . ♀	Pickering	*						
" <i>Collinsonana</i> . ♀	Pickering	*						
" <i>convexuscula</i> . ♂, ♀	Pickering	*						
" <i>Afzebiella</i> . ♂, ♀	Pickering	*						
" <i>nitida</i> . ♂, ♀	Smith	*						
" <i>varians</i> . ♂	Smith	*						
" <i>xanthura</i> . ♂	Dale	*						
" <i>fuscata</i> . ♀	Smith	*						
" <i>chrysoceles</i> . ♀	Smith	*						
" <i>pareula</i> . ♀	Smith	*						
" <i>Grypana</i> . ♂	Smith	*						
" <i>simillima</i> ? ♀, ♂	Smith	..	..	..	..	E. Florida.		
" <i>victima</i>	Smith	..	..	..	..	Nova Scotia.		
"	Sowerby	..	..	..	..	Nova Scotia.		

_____?	Lewis	..	..	..	..	..	..	Tasmania?
<i>Bombus muscorum</i> ?	Templeton	..	..	..	..	..	..	..
<i>Ammophila sabulosa</i> , ♀	Leon Dufour	*	*	..	..	..	..	..
" <i>holosericea</i> , ♀	Smith	..	..	Tunis.	..	..	..	..
" _____, ♂	Smith	..	..	Gambia.	..	..	..	..
" <i>ferrugineipes</i> , ♀	Smith	..	..	..	..	..	..	..
" _____	Templeton	..	..	..	..	..	..	..
" <i>petiolata</i> , ♂	Smith	..	..	..	..	..	..	..
" <i>flavipes</i> , ♀	Smith	..	..	..	..	..	..	..
" <i>Chilensis</i> , ♀	Smith	..	..	..	..	..	..	..
" <i>laboriosus</i> , ♀	Smith	..	..	..	..	..	..	..
" <i>difformis</i> , ♀	Cab. Brit. Mus.	..	..	..	..	..	..	..
" <i>intrudens</i> , ♀	Cab. Brit. Mus.	..	..	..	..	..	..	..
VESPIDÆ.								
<i>Eumenes petiolata</i> , ♀	Smith	..	..	..	..	..	..	..
<i>Odynerus auctus</i> . . . . .	Van Heyden	..	..	..	..	..	..	..
" _____, ♀	Smith	..	..	..	..	..	..	..
<i>Belonogaster juncus</i> , ♀	Cab. Mus. Brit.	..	..	..	..	..	..	..
<i>Polistes Gallica</i> . . . . .	Rossi	..	..	..	..	..	..	..
" <i>fuscata</i> . . . . .	Peck	..	..	..	..	..	..	..
" _____	Templeton	..	..	..	..	..	..	..
" <i>Americanus</i> . . . . .	Smith	..	..	..	..	..	..	..
" <i>instabilis</i> . . . . .	Smith	..	..	..	..	..	..	..
<i>Polybia sericea</i> . . . . .	Smith	..	..	..	..	..	..	..
<i>Vespa vulgaris</i> . . . . .	Van Rozer	..	..	..	..	..	..	..